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TITLE: New information relating to the welding of alloyed steels and alloys at the V. I. Lenin Plant in Pilsen

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 10, 1962, 21 - 22, abstract 10E104 ("Zváranie", v. 11; no. 5, 1962, 130 - 135, Czech; summaries in Russian, German and English)

TEXT: A report on the experience made by the Plant in the manual arc welding of alloyed steels and high alloys, used for the power equipment (turbo-generators, alternators, gas and steam turbines) Steel 15335 alloyed with Cr and modified with Mo, W, V and other elements is used for the cast parts of turbines and for the rotors of steam turbines of 110 - 200 Mwatts working at a steam temperature of 575°C. This steel is conditionally weldable and requires therefore a special technology of welding. Attention must be paid mainly to the temperature of preheating and to the rate of cooling after welding. After a slow cooling from the austenizing temperature, very low  $a_k$  values are obtained. For this

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reason it is recommended to weld this steel with the preheating temperature of 400 - 450°C. Chemical composition of this steel and its welding technology are given. For working temperatures of up to 600°C Cr-steels modified with W and V and with a Cr content up to 13% are used. Chemical composition and mechanical properties of this steel are given. For its welding a preheating of 250 - 450°C is recommended. The welding technology for this steel is described. For working temperatures of 600 - 650°C 18-8 type austenitic steels with Mo, W and V additions, to increase  $\sigma_b$  at high temperatures, and modified with Ti or Nb are suitable. Recently also steels with 13% Cr and 12% Ni have been used at the Plant. When welded seams of these steels are annealed,  $\sigma$ -phase appears in them and reduces sharply  $a_k$  with a maximum at 800°C. At an annealing temperature of 850°C and higher  $a_k$  does not decrease any more. Electrodes E 391 and E 891 are used. For working temperatures of > 650°C special high Ni- and Cr-base alloys alloyed with W, Mo, Ti, Al and Fe are used. Chemical composition and the welding technology of B3V-60 (VZU-60) alloy are given. The welding of VZU-60 alloy is performed in argon medium. To prevent the crack formation a preheating to 700°C is used. The added material has the same chemical composition as the base material. Also materials with different structures - austenitic and ferritic - are welded

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at the Plant. This junction is carried out with a welding wire containing 60% Ni and 17% Cr which prevents the diffusion of C from ferritic into austenitic material.

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[Abstracter's note: Complete translation]